

Milltown Reservoir Sediments Cleanup

Informational Public Meeting

Wednesday, October 15, 2008

Thompson Falls High School Gym



Welcome!

Tonight's Meeting

- Project Overview
- Impacts after the Breach
 - Sediment Scour
 - Water Quality – surface and groundwater
 - Fishery and Aquatic Life
 - 2009 Mitigation
- Restoration and Redevelopment
- Overall Schedule



Milltown Reservoir Sediments Site



Important Points

- **Thompson Falls' water supply is not affected by the Milltown cleanup.** Arsenic levels are dropping in monitoring wells near the site, indicating improved groundwater quality --- the primary reason for all this work: cleanup the local drinking water supply. No increases in Arsenic downstream of site.
- **It's safe to eat fish from the CFR.** Arsenic doesn't accumulate in fish, haven't seen signs of damage to fish from copper. There are other concerns about fish that are not related to this project. As with other rivers and lakes, limit consumption of older fish due to mercury.
- **The fishery is doing better than expected below the former dam** and there has been no change/impact below the Bitterroot. Increases in fish numbers above the CFR
- **It's safe to recreate along the banks of the Clark Fork River.** Playing at beaches, fishing, or other exposure to sands and sediments deposited downstream of former Milltown Dam does not pose a risk to people or pets. Arsenic levels are low.
- **It's safe to swim in the Clark Fork River.** Being exposed to CFR water while swimming does not pose a risk to people or pets. Arsenic levels are low.

Slide from March 2008 Public Meeting

Breach: Short-term Impacts to Aquatic Life

- Almost 300,000 tons of sediment (primarily clean from the BFR) will scour downstream
- Sediment will cause additional stress on the fishery and cause a decline in fish populations (primarily down to the Bitterroot River)
- Primary route of mortality will probably be increased bacterial and fungal infections during high temperature periods (July and August)
- Macro-invertebrates will be impacted because of the sediment, primarily sand, filling the spaces between cobble and gravels

What do we focus on for risk?

To determine if there are risks to fish and aquatic life:



- Look at dissolved copper and TSS
 - Copper – it's toxic to fish in tiny amounts
 - TSS – too much sediment in water can suffocate fish
- Monitoring results:
 - Copper was below construction standards
 - TSS exceeded only on the day of the dam breach
 - Below standards ever since

What do we focus on for risk?

To determine if there is a risk to public health from drinking water:



- Look at dissolved arsenic in river and in drinking water wells
- Results:
 - Arsenic has been below drinking water standards (except for the day after the breach)
 - Arsenic levels are decreasing in wells

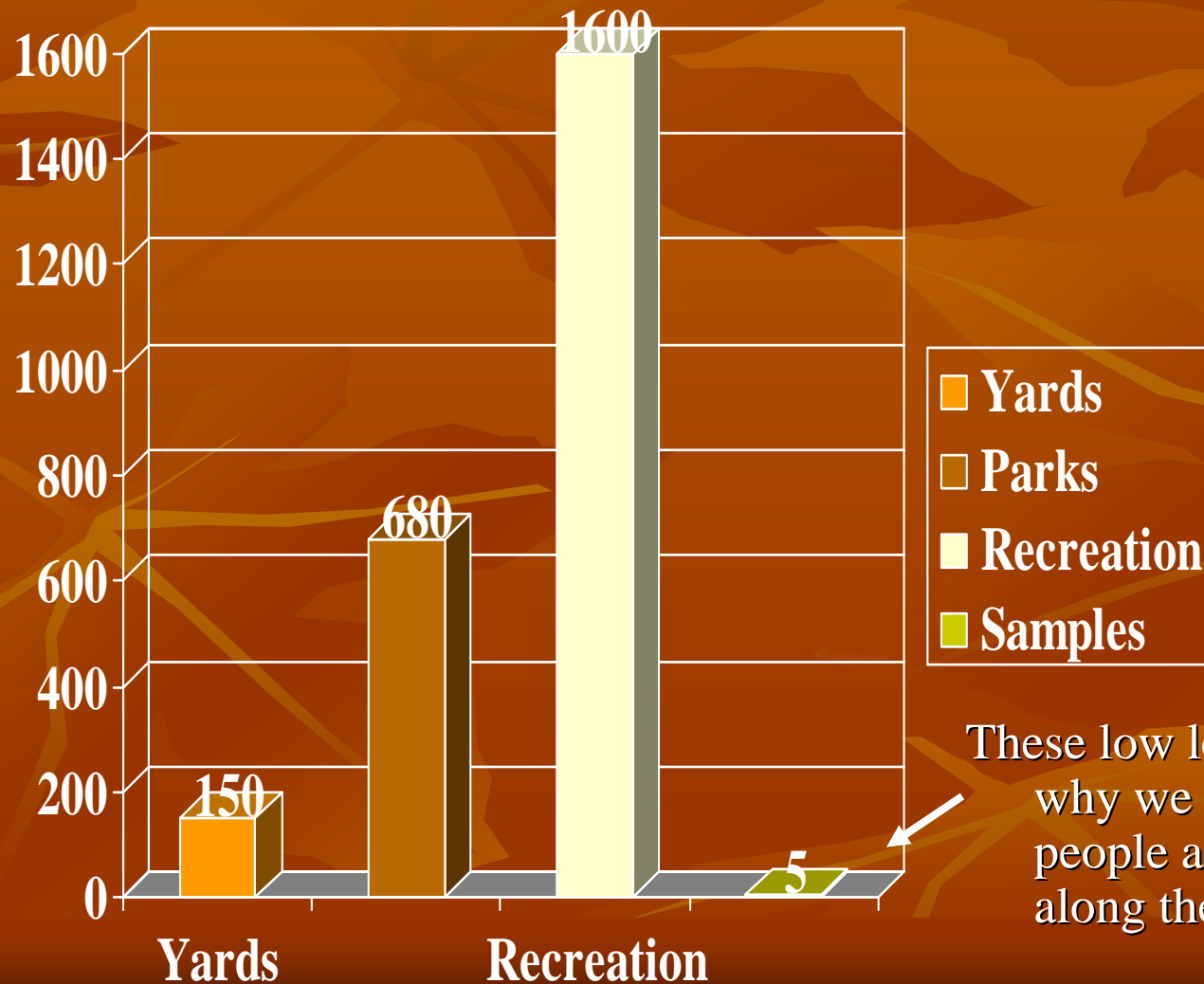
What do we focus on for risk?

To determine if there is a risk to public health from river recreation:

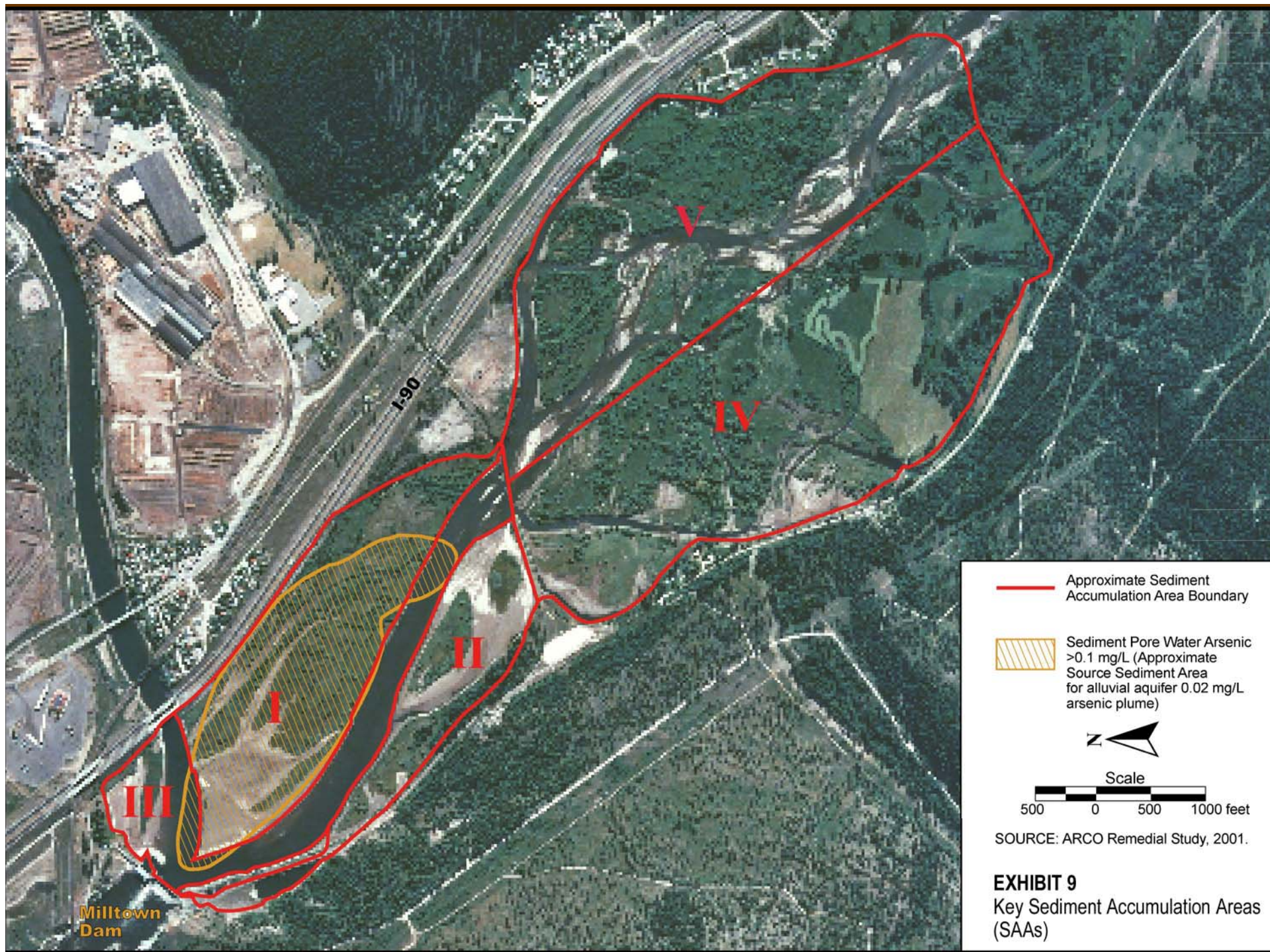


- Look at total arsenic in riverbank sediment
- Results
 - Much lower than health-based standards
 - 6 – 21 ppm from confluence of Clark Fork and Blackfoot Rivers downstream to the Bitterroot River
 - Less than 5 ppm downstream of Bitterroot River

Why it's safe to recreate along the Clark Fork River



These low levels of arsenic are why we say it's safe for people and pets to recreate along the Clark Fork River.



After the Breach – what happened?

- Sediment Scoured from Entire Project Area

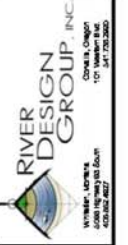
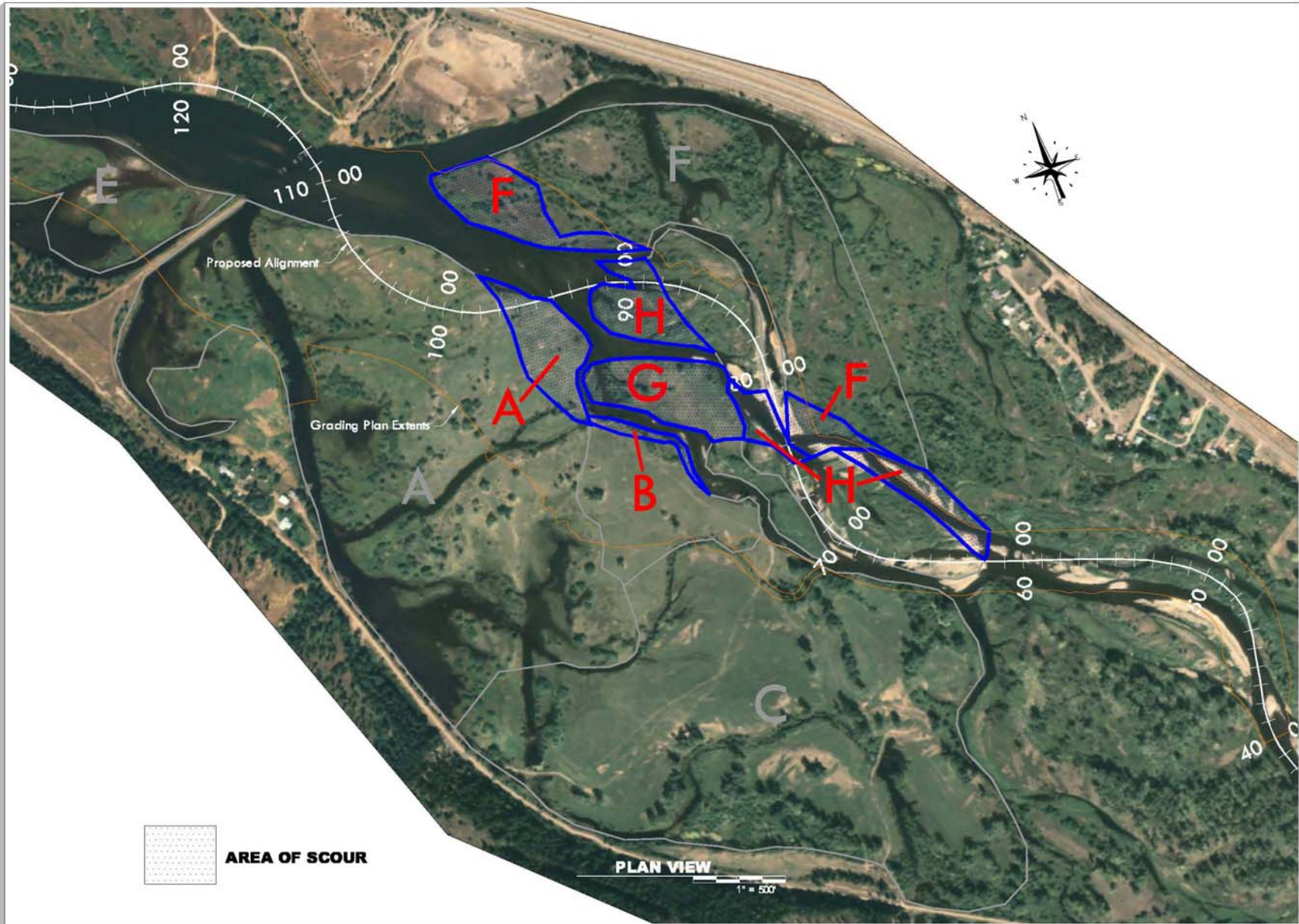
- Total predicted: 300,000 tons
- Actual: 371,000 tons scoured (23% more)

Where did material scour from?

- Remedial Project Area: 163,000 tons
- SAA 4 & 5 (area upstream of Duck Bridge):
 - State predicted 50,000 tons
 - EPA scour estimate: 208,000 tons
 - State LIDAR scour estimate: 210,000 tons
(150,000 tons is sediment; 60,000 tons alluvium)
 - Scoured amount represents about 6% of area sediments

Milltown Dam

- Remember, the Milltown Dam has been a “run-of-the-river” dam for years
- This means that material coming down the Clark Fork River continued on downstream
- Depending on the flow, there would be periods of deposition or periods of scour
- Therefore, removal of the Milltown Dam did not change transport from upstream



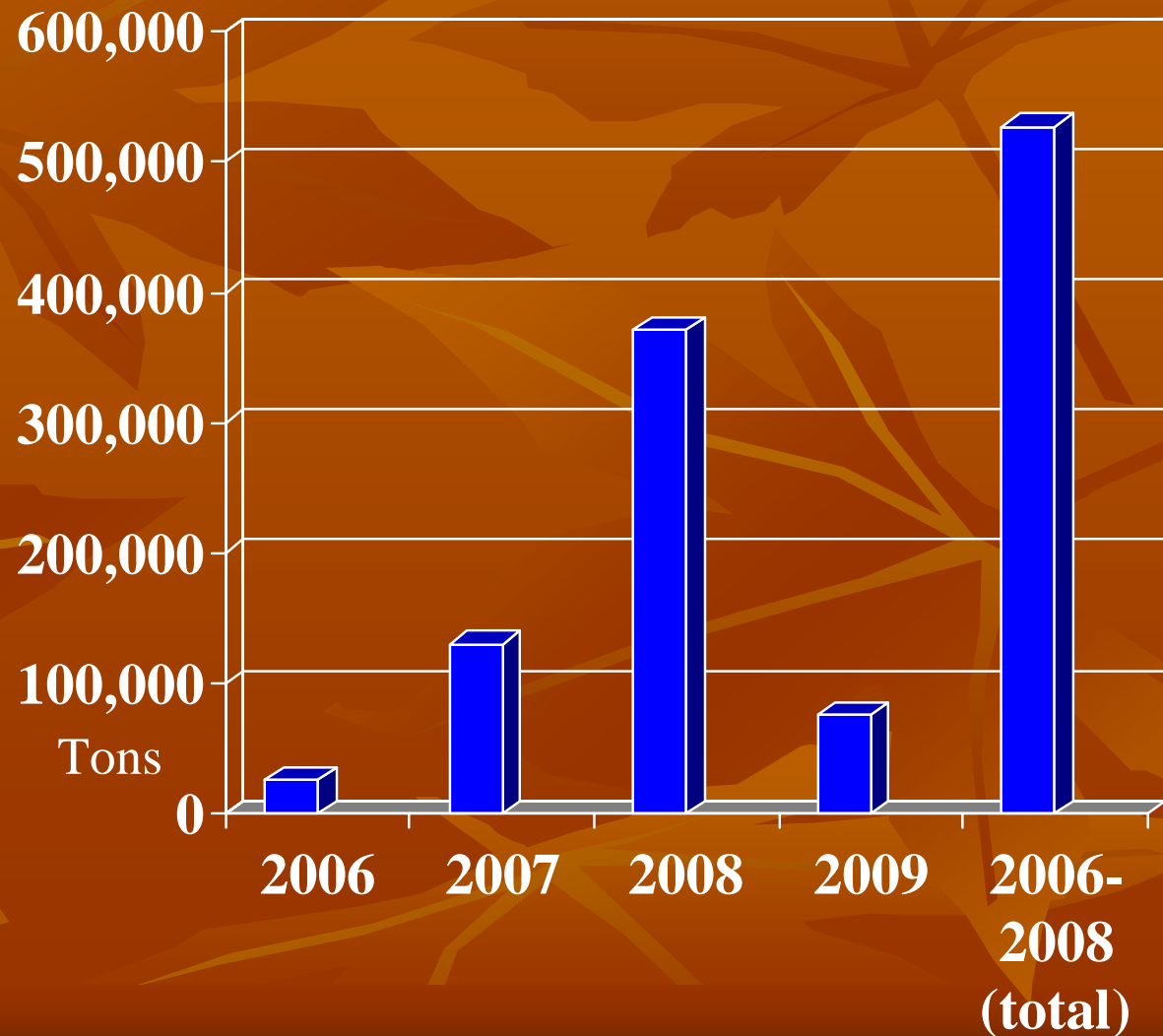
PLAN VIEW 10-3-08
NOT FOR CONSTRUCTION
CLARKFORK RIVER

NO.	DATE	BY	REVISION/DESCRIPTION
1	10/3/08	NMW	EXISTING SURFACES

FILE NAME: Ldar
 PROJECT NO: RDG 08 030
 SHEET XS-1

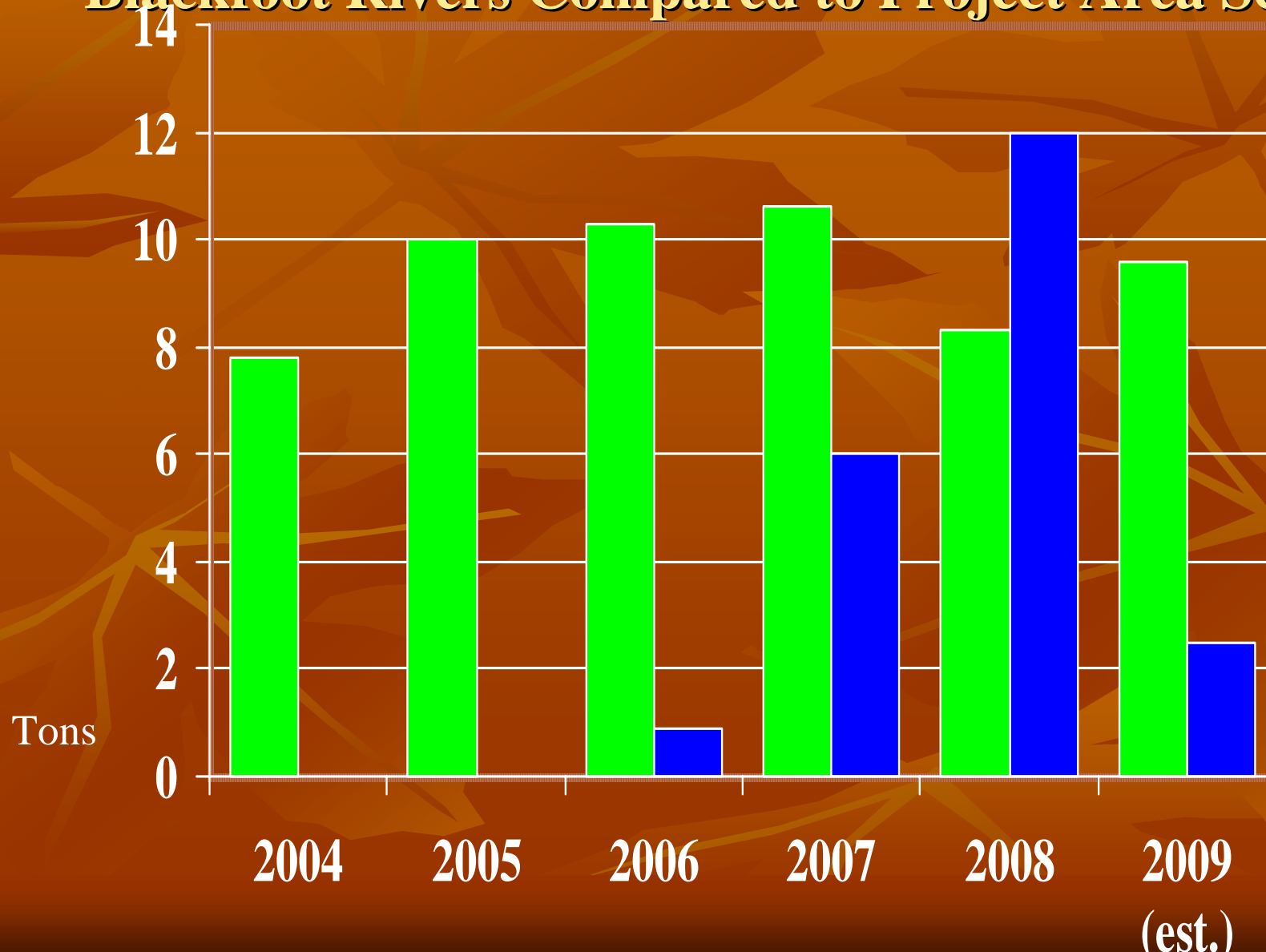
Scouring – Big Picture

- Expected about 603,000 tons* of scouring in the 4 high flow periods during project construction
- To date, 87% of the material expected to scour has already scoured
- The remaining 76,000 tons may scour in 2009



*Measured as suspended sediment

Arsenic Loading from Upper Clark Fork and Blackfoot Rivers Compared to Project Area Scour



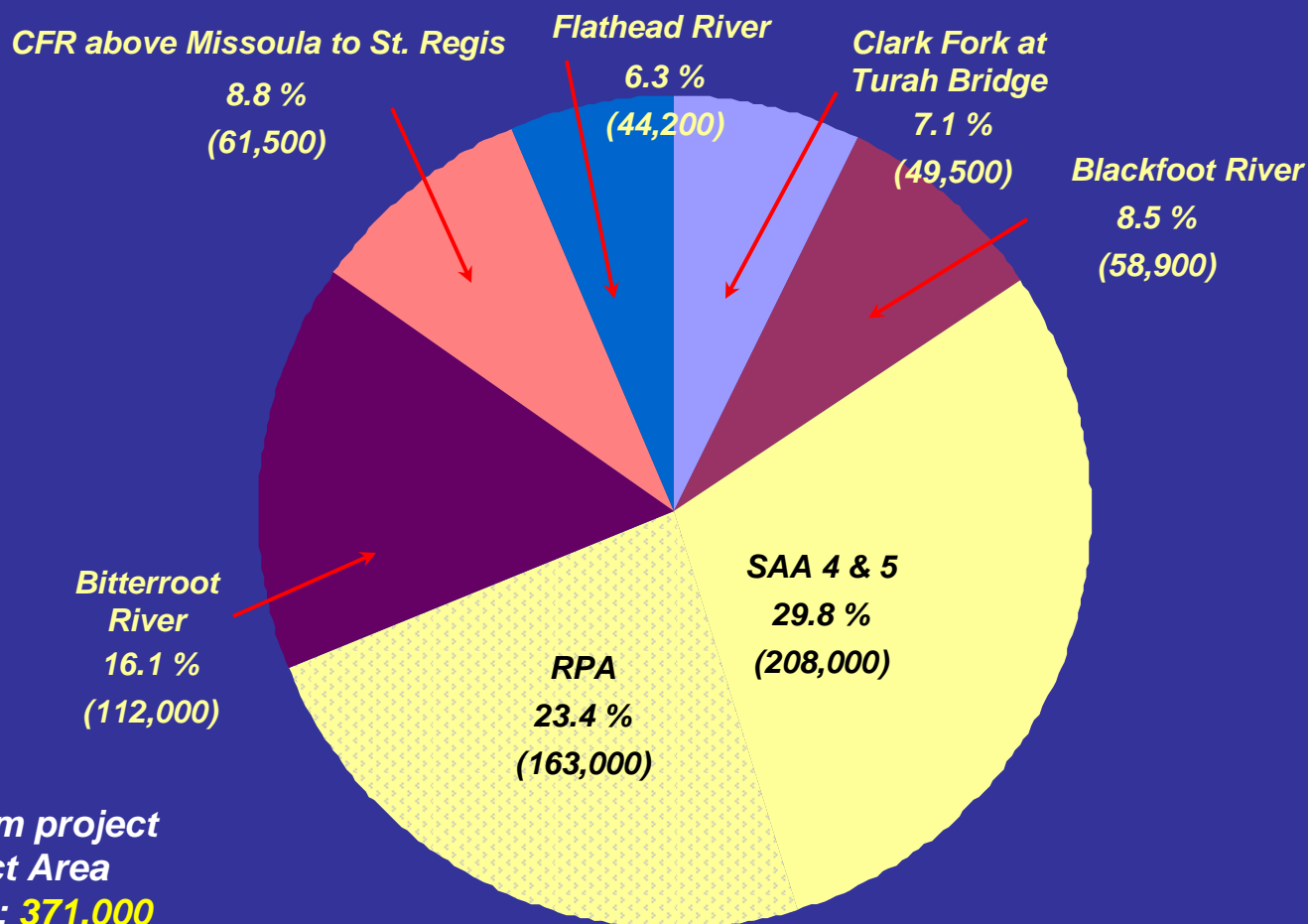
Removal of Arsenic from the Clark Fork River System

- As part of the cleanup, 1,000 tons are being removed from reservoir
- Originally predicted a total of about 10 tons to be transported downstream from scouring
- Each year about 10 tons are transported down the Clark Fork River naturally
- We expect a total of about 21.4 tons of Arsenic from the project area

ESTIMATED TRANSPORT TO THOMPSON FALLS AND RELATIVE CONTRIBUTIONS FROM UPSTREAM SOURCES

(MARCH 28 THROUGH JUNE 30, 2008)

ESTIMATED CUMULATIVE **SUSPENDED SEDIMENT** LOAD FOR PERIOD (in tons)
Estimated suspended sediment load to Thompson Falls: **697,000 tons**



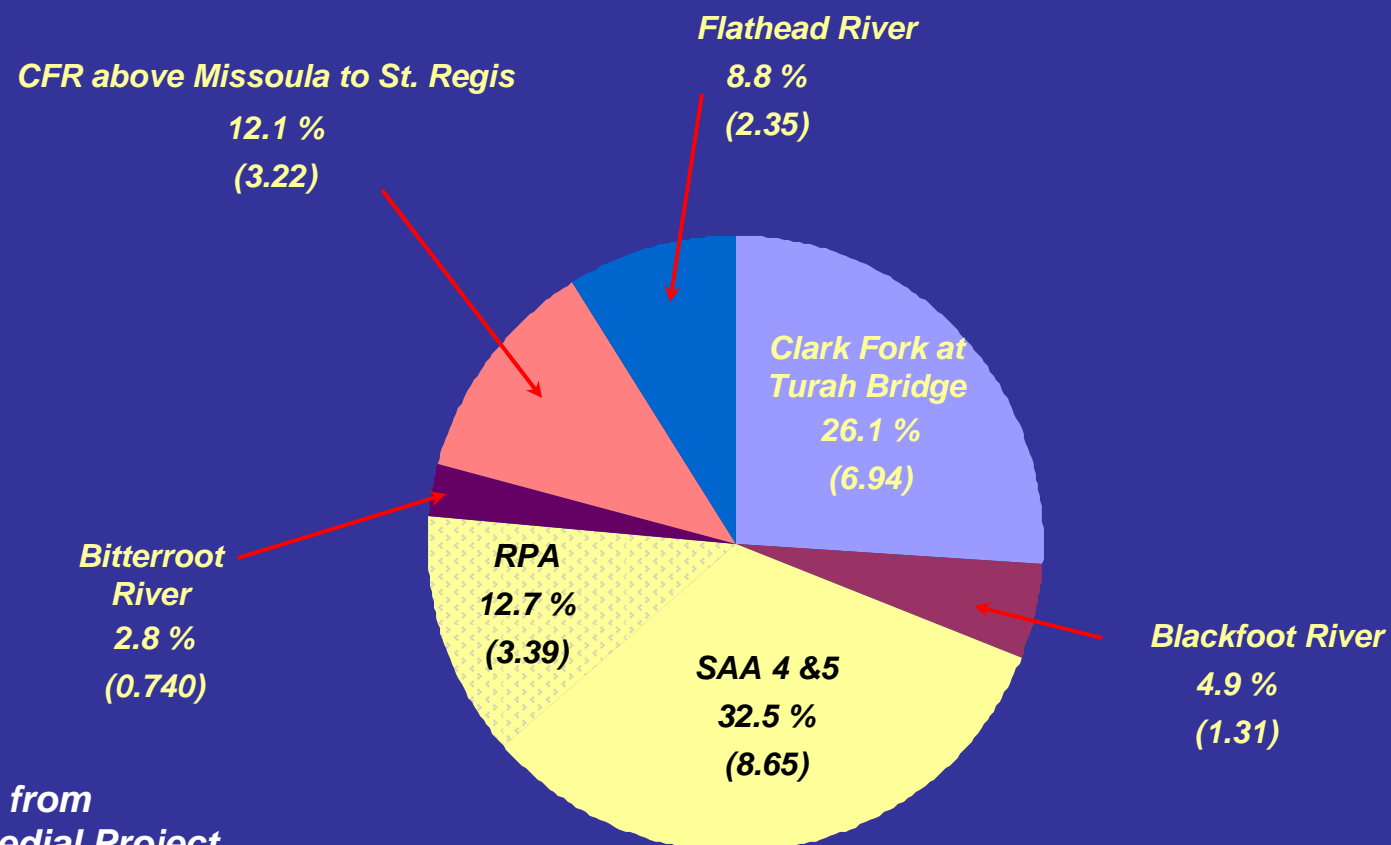
Total contribution from project area [Remedial Project Area (RPA) and SAA 4 & 5]: **371,000 tons (53.2%)** (There is substantial uncertainty in the apportionment of this contribution between RPA and SAA 4 & 5)

**PROVISIONAL INFORMATION;
SUBJECT TO REVISION**

ESTIMATED TRANSPORT TO THOMPSON FALLS AND RELATIVE CONTRIBUTIONS FROM UPSTREAM SOURCES

(MARCH 28 THROUGH JUNE 30, 2008)

ESTIMATED CUMULATIVE **ARSENIC** LOAD FOR PERIOD (in tons)
Estimated arsenic load to Thompson Falls: **26.6 tons**



Total contribution from
project area [Remedial Project
Area (RPA) and SAA 4 & 5]:

12.0 tons (45.2%)

(There is substantial uncertainty in the
apportionment of this contribution
between RPA and SAA 4 & 5)

**PROVISIONAL INFORMATION;
SUBJECT TO REVISION**

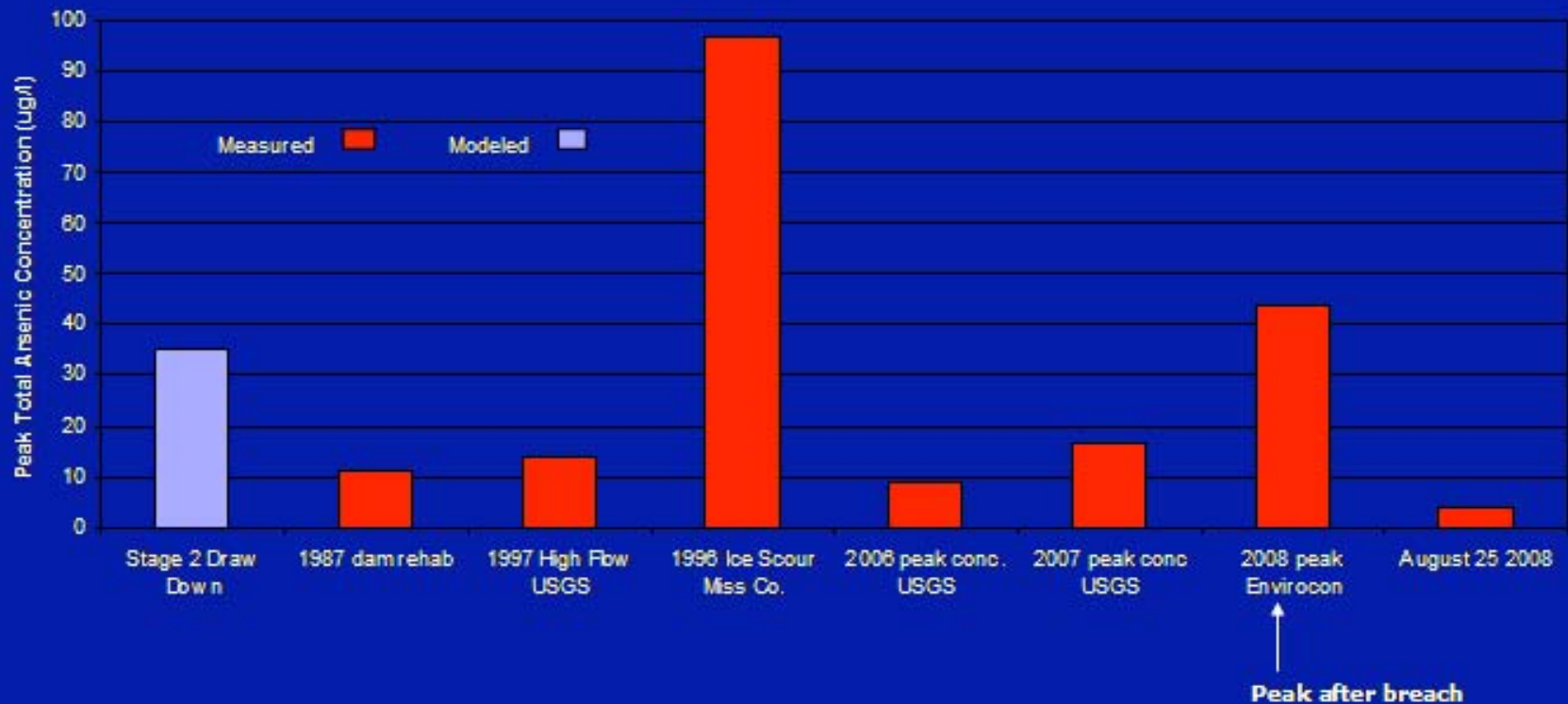
What do all these numbers mean?

How do the concentration of Arsenic, Copper and Total Suspended Solids (TSS) compare with other years?

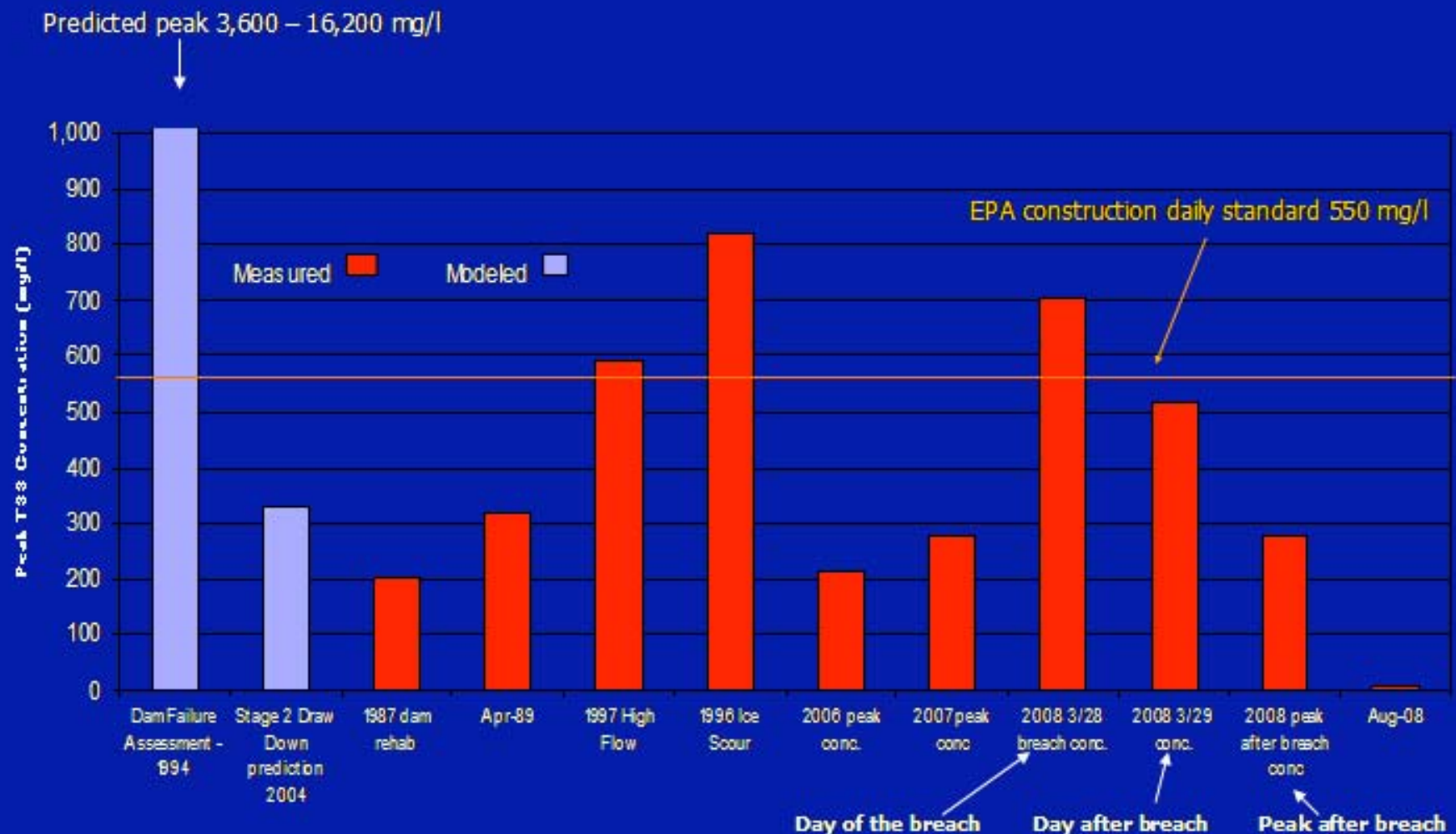
Dissolved Arsenic Concentration Predicted and Measured (micrograms/L)



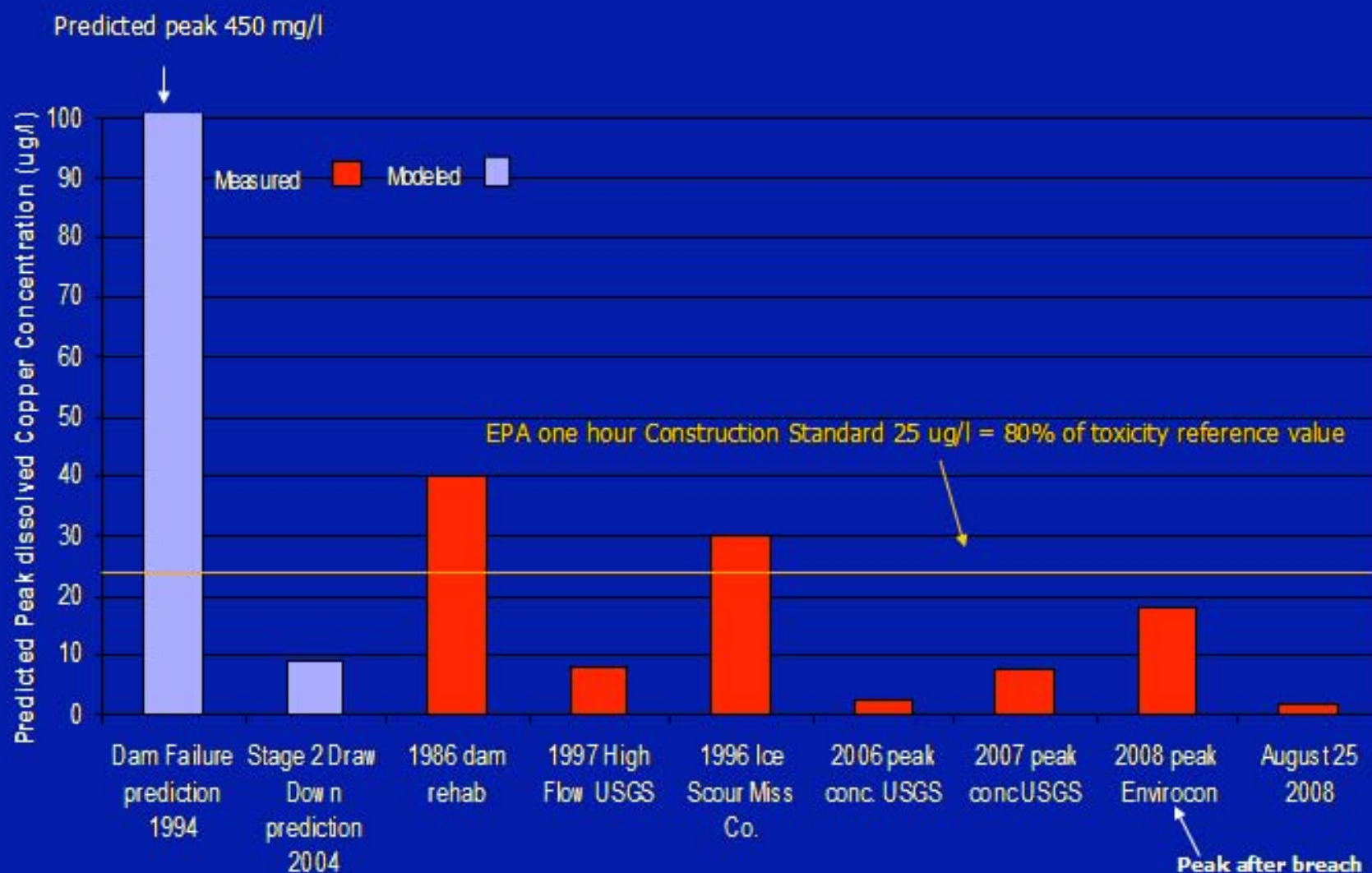
Total Arsenic Concentration Predicted and Measured (micrograms/L)



Total Suspended Sediment Concentration Predicted and Measured (mg/L)



Dissolved Copper Concentration Predicted and Measured (micrograms/L)



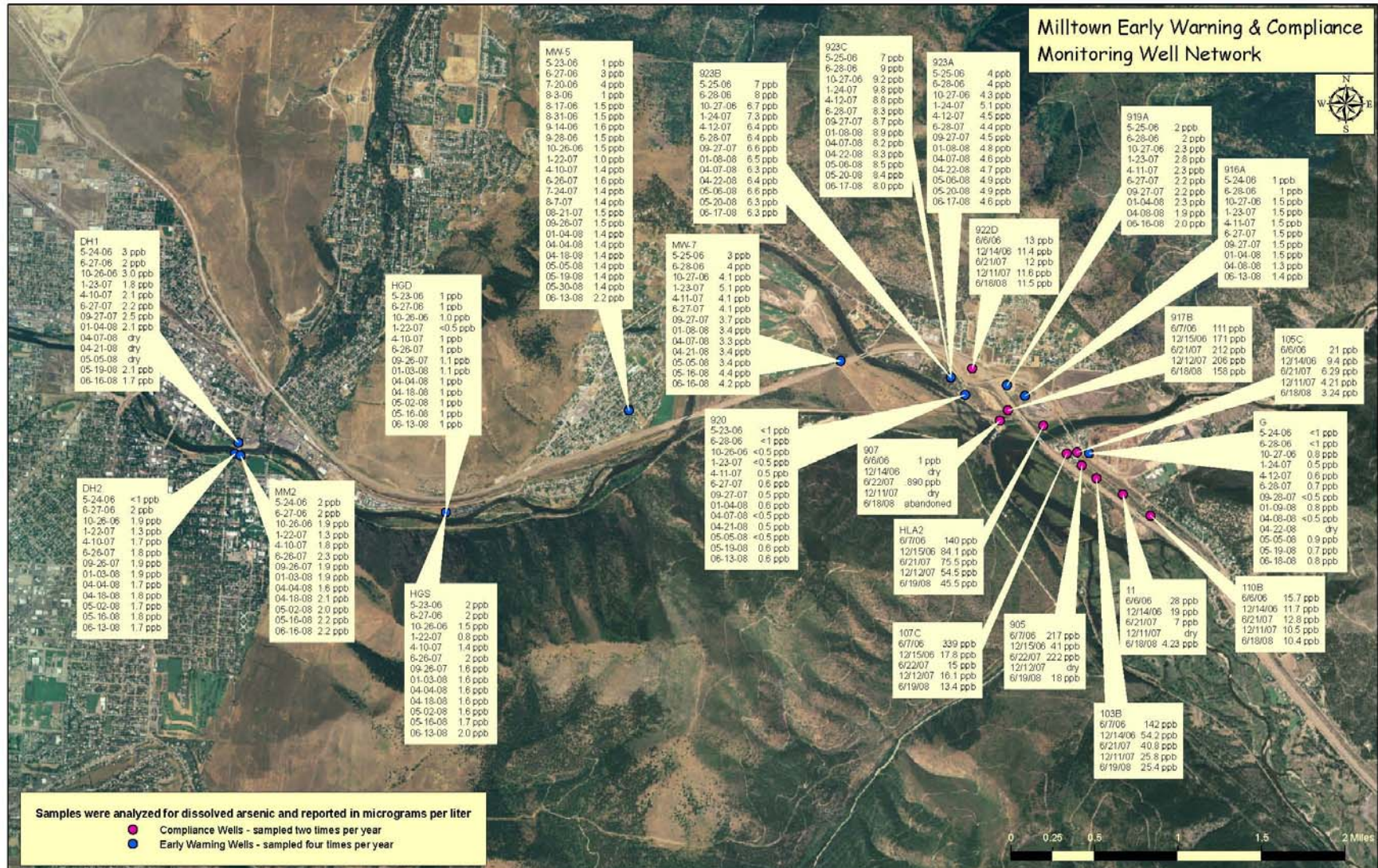
Impact of Milltown Cleanup on Thompson Falls

- To date, the Milltown project has delivered about 19 tons of arsenic to Thompson Falls.
- EPA expects another 2.5 tons to come downstream, perhaps in 2009.
- This is a very small proportion of the total amount of arsenic already present in the Thompson Falls Reservoir and that will continue to arrive at the Reservoir from other upstream sources.
Ex: 14 tons arrived from other sources in 2008
- Therefore, the impact of the Milltown cleanup on Thompson Falls is very small.

No impact on Thompson Falls' drinking water supply

- Maximum 15.5 ppb Arsenic on 3/29/08 at Milltown
 - Occurred due to pore water drainage – not scouring
 - Triggered 2 months of sampling in early warning monitoring wells along CFR
 - No increase in Arsenic levels in these wells
- Significant decreases in arsenic in wells near former reservoir reducing arsenic loading to aquifer
- The contribution of arsenic from the remedial action portion of the cleanup does not pose a significant additional risk to Thompson Falls' water supply

Early Warning and Compliance Monitoring Well Network



Water Quality Trends – Compliance Monitoring Wells



Fish: Monitoring the effects of dam and sediment removal in 2008*

- Water sampling
- *In situ* juvenile fish bioassays (caged fish)
- Adult trout movement, avoidance and mortality
- Fish population monitoring

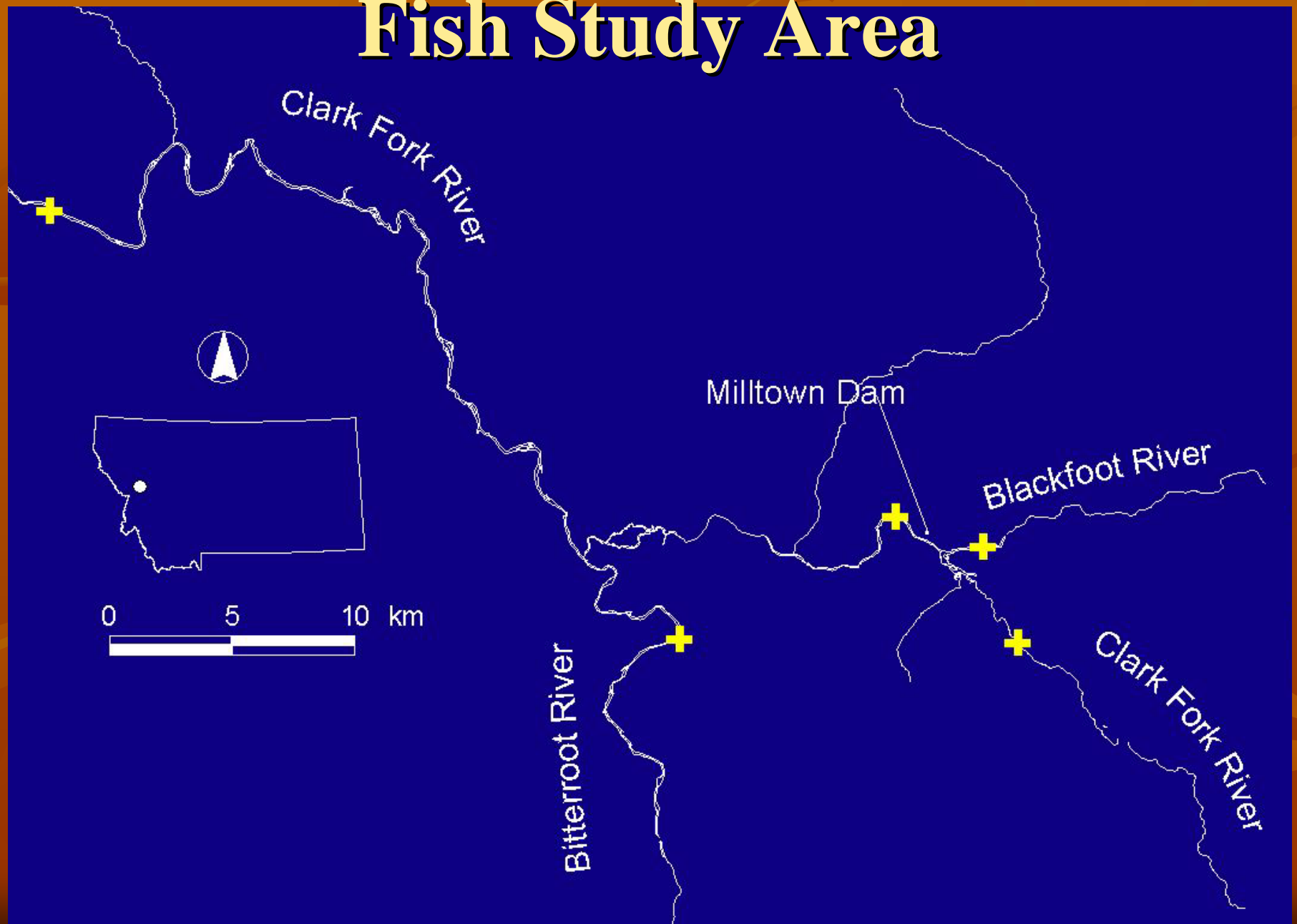


*Information provided by FWP

Overall Results of Fish Studies: 2008

- Impacts observed in area between former dam and Bitterroot River
- Minimal project-related impacts below Bitterroot
- Decreased fish densities below dam to Bitterroot
- Significant fish passage; increased fish populations upstream of former dam on Clark Fork River
- Changes in fish densities: decreased below former dam; increased above (mortality and/or movement?)

Fish Study Area



Caged fish results: 2008

- **Less mortality than in Stage 1**
- **Greater downstream of dam, but similar to Blackfoot**
- **In all years, effects restricted mainly upstream of Bitterroot**
- **Drawdowns caused a significant stress to fish**
 - **Not a source of acute mortality or toxicity**
- **Mortality caused by cumulative effects of many stressors including:**
 - **sediment quantity**
 - **sediment composition**
 - **water temperature**

Radio telemetry- movement and mortality: 2008

- **More movement in Milltown Section**
- **Mortality less than in past, but greater than control**



Population Density Monitoring: 2008

- **Increase at Turah (and likely Blackfoot)**
- **Decline in Milltown**
- **No change in Huson**
- **Slight increase in Bitterroot**

Trout densities (> 175 mm)



Year/ Location

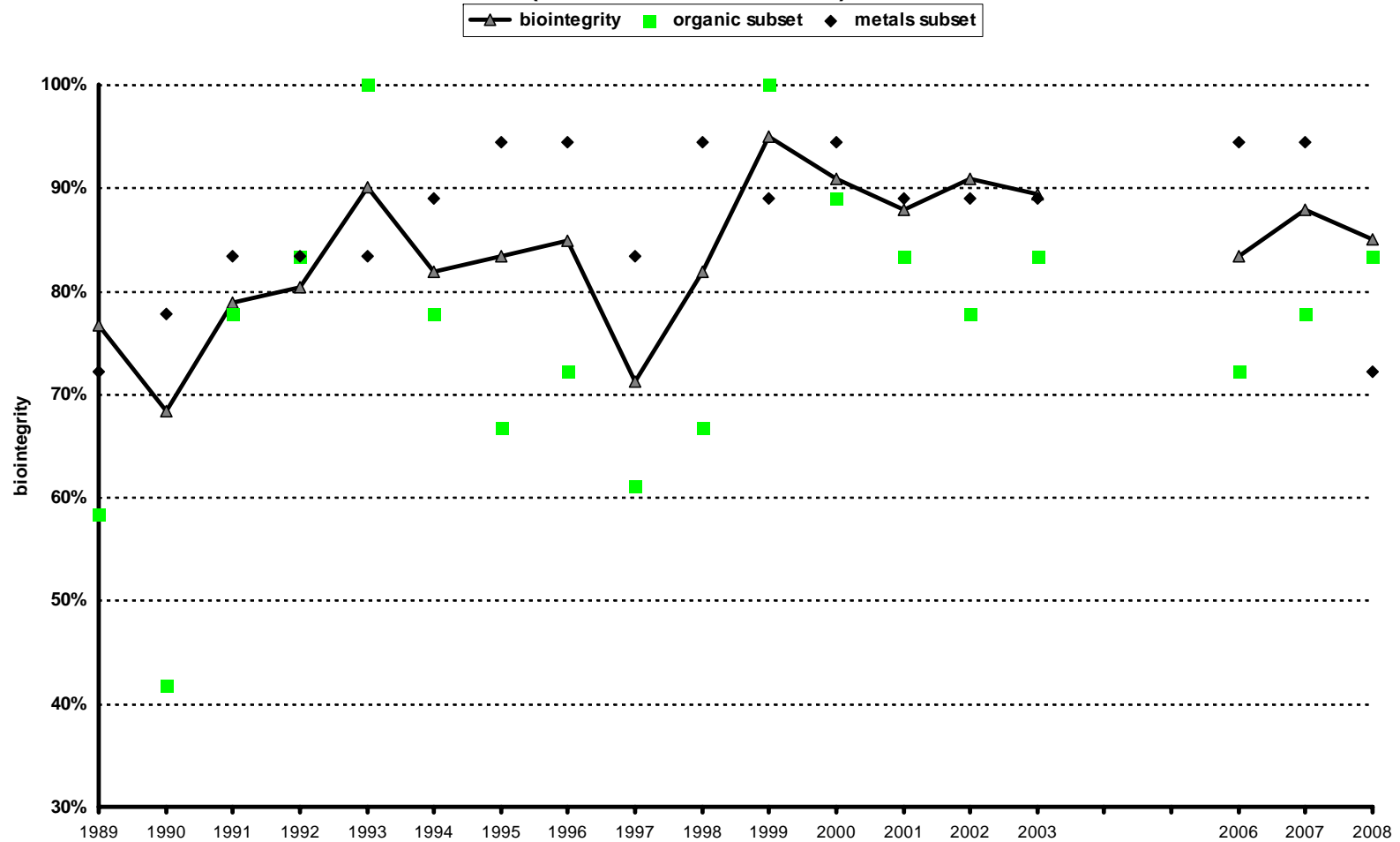
Stage 2 drawdown Impacts (2008)

Macro-invertebrates (bugs)

- Significant impact on macro-invertebrate density between the dam and the Bitterroot; everything is normal below the Bitterroot River
- Population was about 30% of norm
- Bio-integrity was slightly impaired
- Diversity was near normal
- Author believes drop in population was due to “habitat alteration” from sand deposition in riverbed

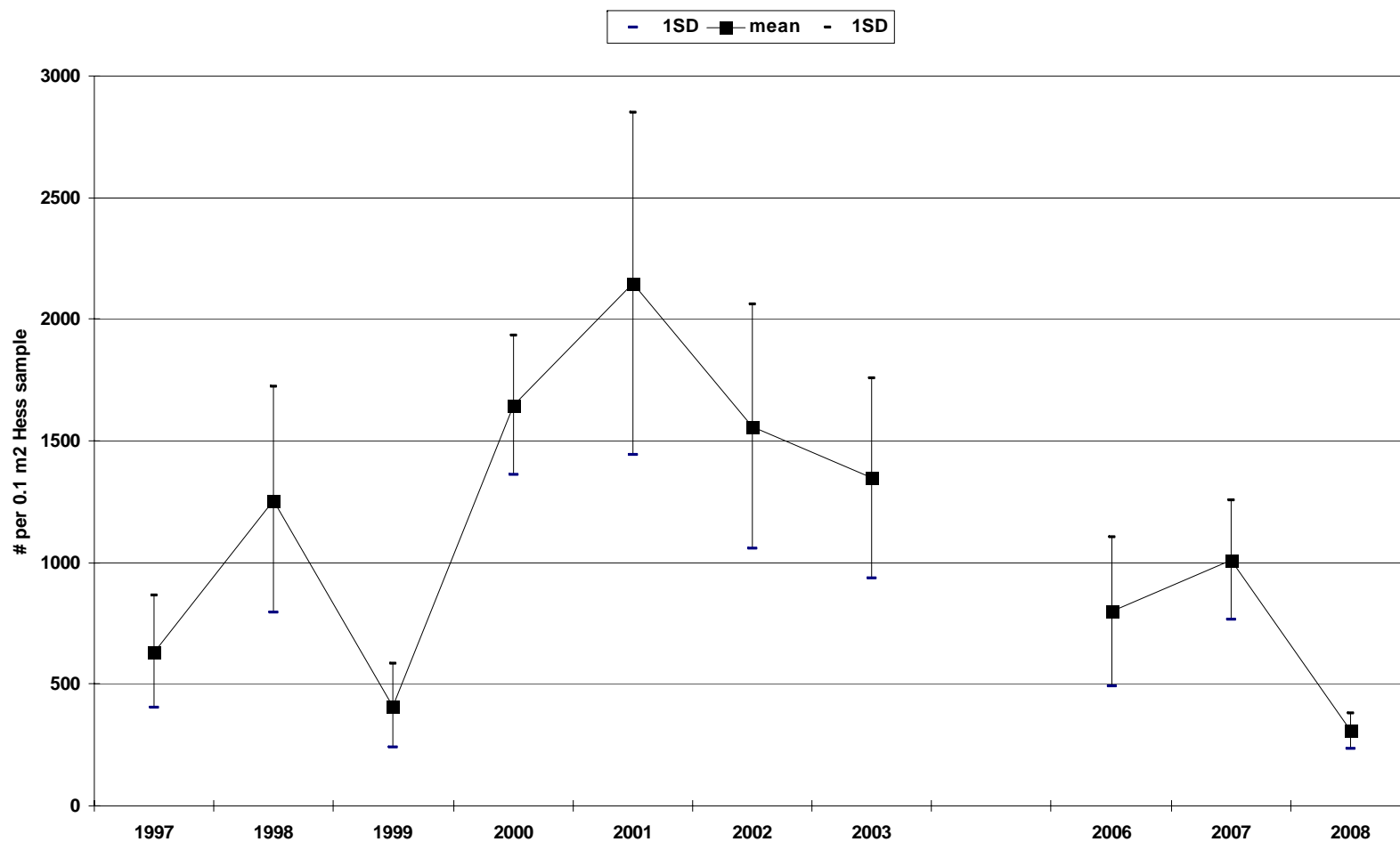
Macro-invertebrate Bio-integrity

Figure 2. Macroinvertebrate community biointegrity in the Clark Fork River above Missoula (ShaRon FA station 15.5) 1989-2008.



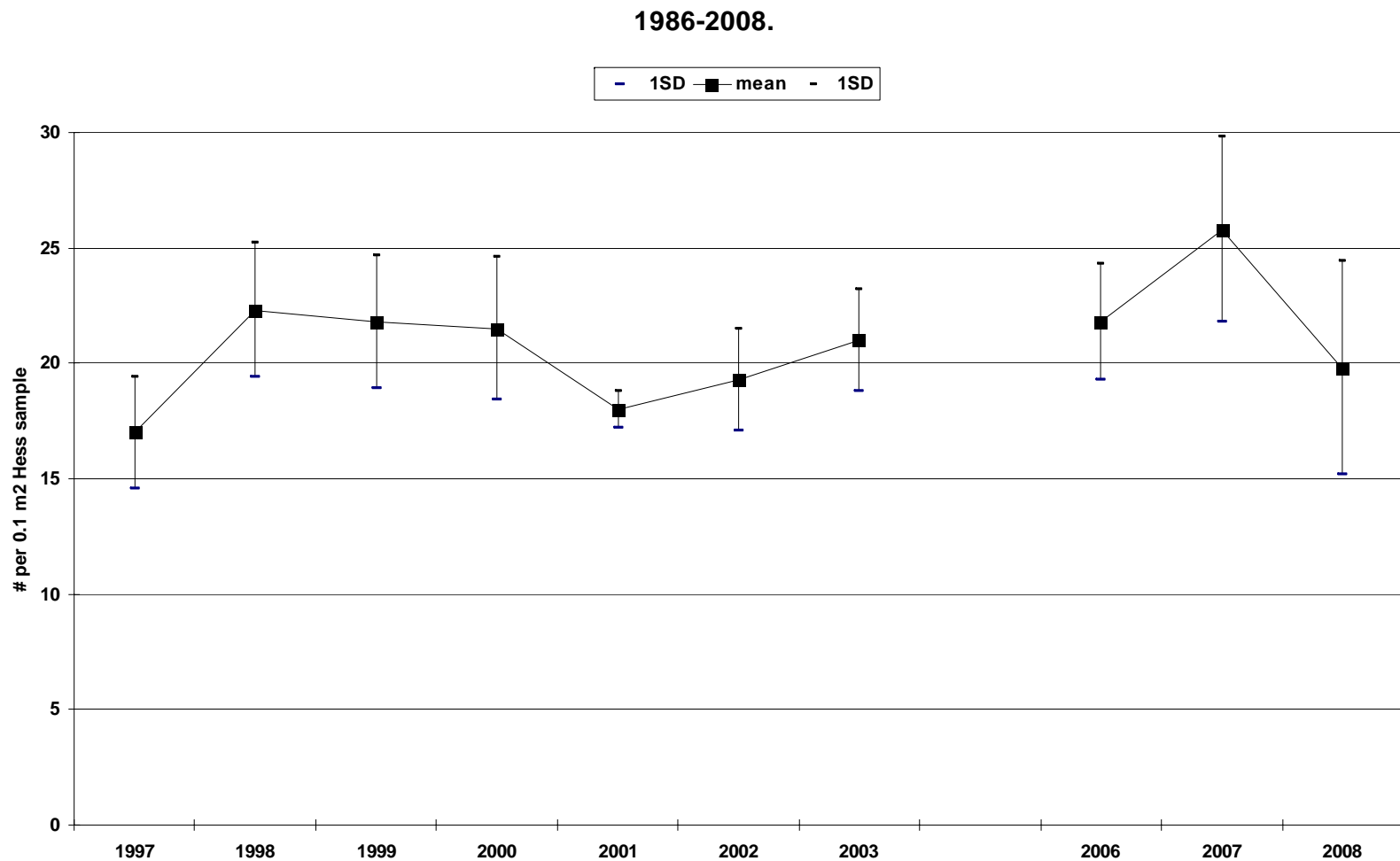
Macro-invertebrate Density 1997-2008

Figure 3. Macroinvertebrate community density in the Clark Fork River below Milltown Dam (ShaRon F.A. - station 15.5) August, 1986-2008.



Diversity of Aquatic Insects: 1997-2008

Figure 4. Number of EPT taxa (mayflies, stoneflies and caddisflies) per Hess sample below Milltown Dam (ShaRon F.A. - station 15.5) August, 1997-2008



Milltown Project Area



Sediment Removal

- Removed over 1.5 million tons to date
- Slightly over half done
- Expect to be finished with excavation next October
- If SAA 3b sediments are removed, excavation will take an additional 3 mos.



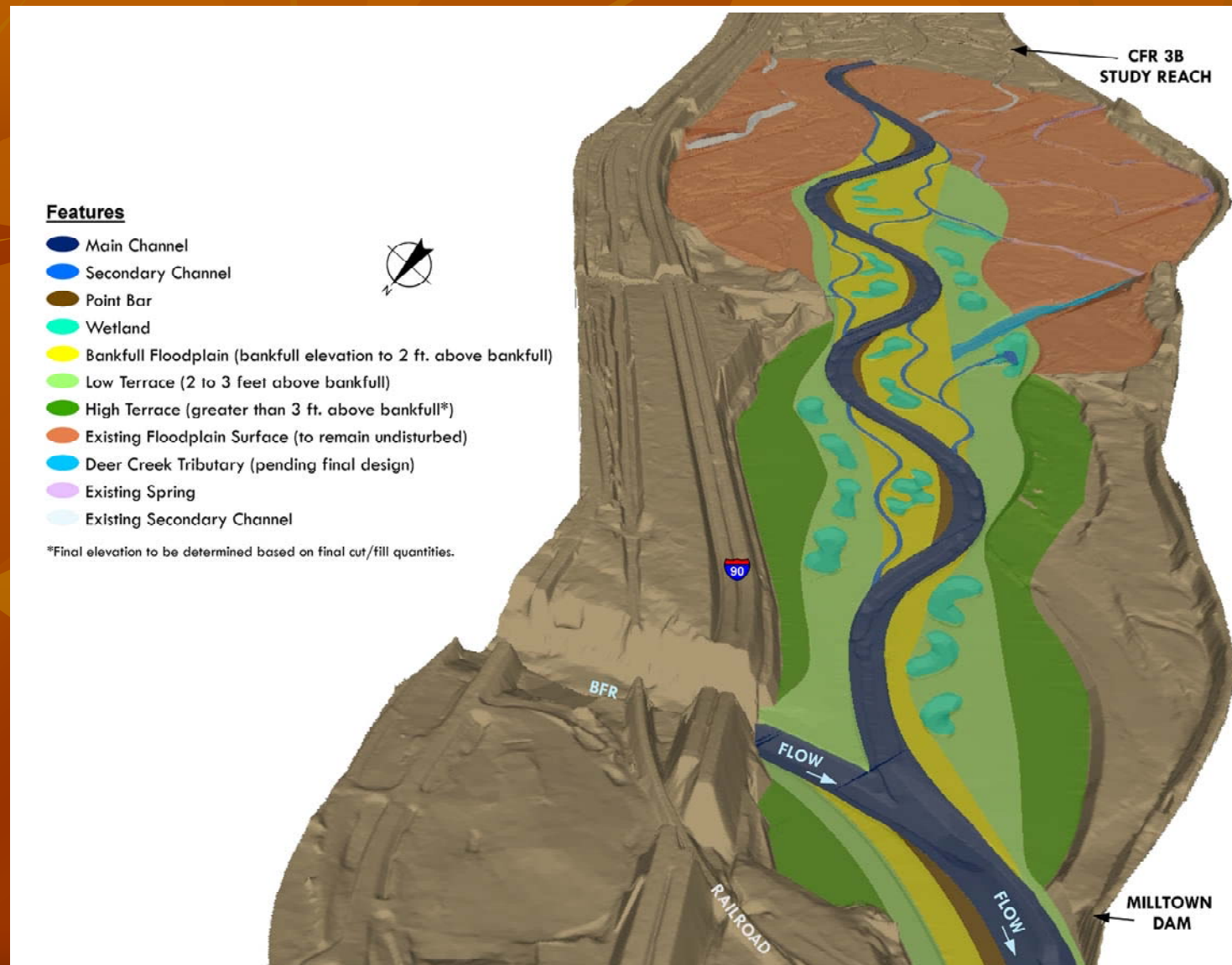


October 10, 2008

Wells and Groundwater

- Only reduced (or no change) arsenic concentrations in wells close to the site
- No changes in arsenic concentrations in wells downstream of the Site
- No significant drop in water levels in wells following the Stage 2 drawdown (model predicted about 3-4 feet in West Riverside)
- Expect no significant drop in water levels following the Stage 3 drawdown

Restoration



Restoration Activities

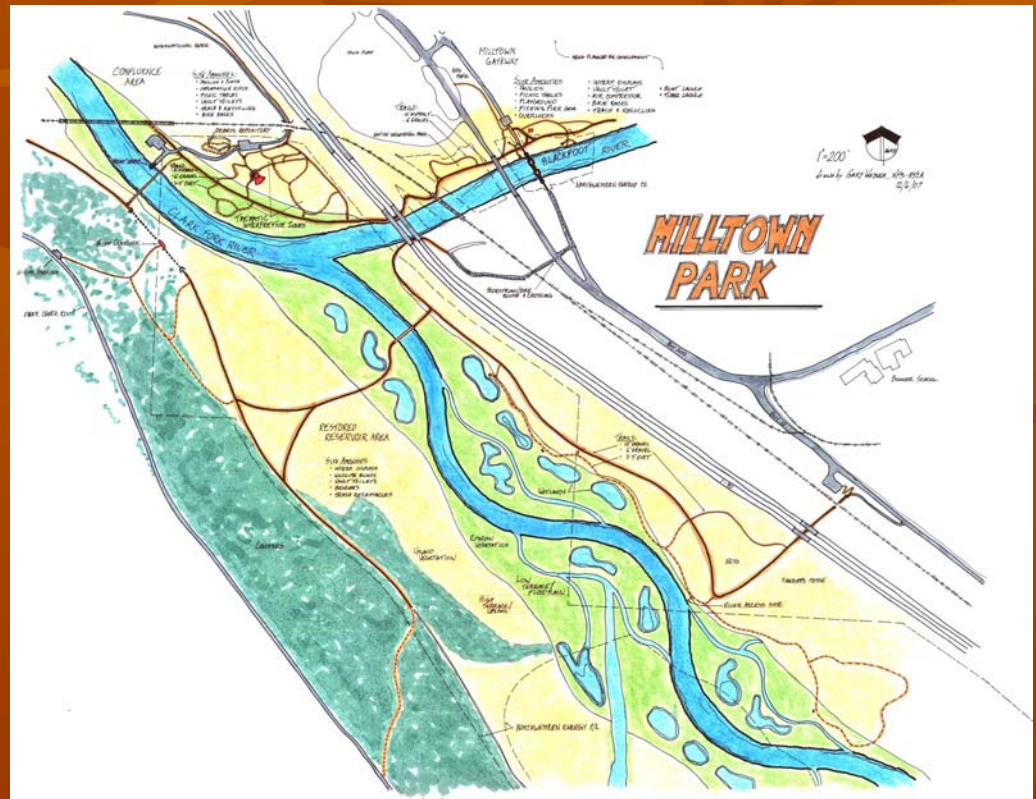
- Site Preparation Planting
 - Upstream of Duck Bridge planting starting October 20
 - Downstream seeding end of October
- Upstream Reach CFR 3B construction early winter 2008/2009
- Upstream Reach CFR 3A floodplain construction Spring / Summer 2009

SAA IV & V Erosion

- EPA/State looking at measures to decrease loss of sediment in restoration area upstream of Duck Bridge (Areas 4 & 5)
- Possible Measures:
 - Sediment removal
 - Bank armoring/flow deflectors
 - New channel excavation thru 2008 scoured area

Site Redevelopment

- Milltown Redevelopment Working Group
- Updated Redevelopment Plan in July 2008
- Working toward creation of a new MT State Park (Confluence State Park?)
 - Milltown Gateway Area
 - Confluence Area
 - Reservoir Area
- State working with NorthWestern on transfer of its Milltown lands



Overall Project Schedule

- Work to be completed in 2008
 - Highway 200 Bridge
 - Pedestrian Bridge
 - Spillway removal
 - Spillway coffer dam breach

Overall Schedule

- Work to be completed in 2009
 - I-90 abutment slopes (before high flow)
 - SAA 4 & 5 BMP implementation (before high flow)
 - Sediment excavation – October
 - Infrastructure removal
 - Repository closures
 - Floodplain/rough channel construction
 - Remedial Action Completion - late 2009/early 2010 (before high flow 2010)

Important Points - Review

- **Thompson Falls' water supply is not affected by the Milltown cleanup.** Arsenic levels are dropping in monitoring wells near the site, indicating improved groundwater quality --- the primary reason for all this work: cleanup the local drinking water supply. No increases in Arsenic downstream of site.
- **It's safe to eat fish from the CFR.** Arsenic doesn't accumulate in fish, haven't seen signs of damage to fish from copper. There are other concerns about fish that are not related to this project. As with other rivers and lakes, limit consumption of older fish due to mercury.
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For more information:

<http://www.epa.gov/region8/superfund/mt/milltown>

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- Keith Large, DEQ, 841-5039
klarge@mt.gov



The background of the slide is a solid dark orange color, overlaid with a pattern of lighter orange, stylized autumn leaves. The leaves are scattered across the frame, with some showing prominent veins. The overall aesthetic is warm and seasonal.

Open Discussion

Thank you!